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04120297 13.05.1992

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D06F 39/00

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(56) Documents cited
GB 2015870 A GB 1536382 A EP 0513688 A1
EP 0088611 A2

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UK CL (Edition L) A4F F29A2A, D1A AAA AB ACA ACB ACC ACD ADJ ADL ADX AFA AFX, G3N NGL, H3Q QBRS QBRX
INT CL[5] A47L, D06F
Online databases: WPI

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(54) Remotely controlled washing machine

(57) A remotely controlled washing machine includes a remote control transmitter (4) detachably mounted on an operation panel (5) drawably housed in a top cover (2). The transmitter (4) includes a plurality of operation members for setting control commands necessary for the washing operation and a transmission section (42) for transmitting set command signals. The transmitted command signals are received by receiving sections (44, 45) mounted in the top cover (2). The transmitter (4) is used in a remote control mode when detached from the operation panel (5) and it is used in an attachment mode when attached to the operation panel (5). Switching means are provided to select, in dependence on whether the operation panel is in or out, which section (44, 45) is rendered effective.

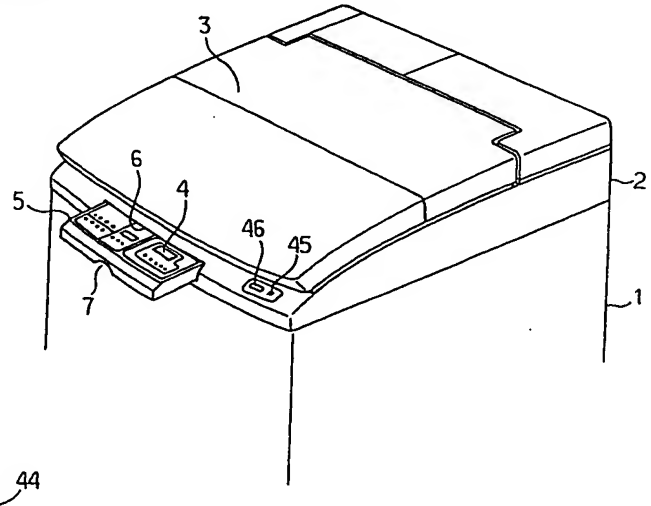

FIG.1

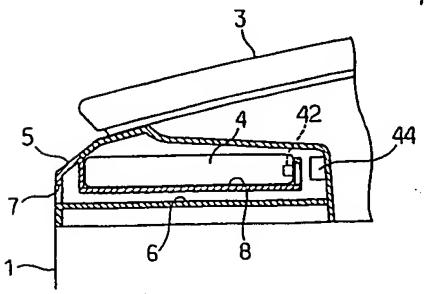

FIG.2

GB 2 265 158 A

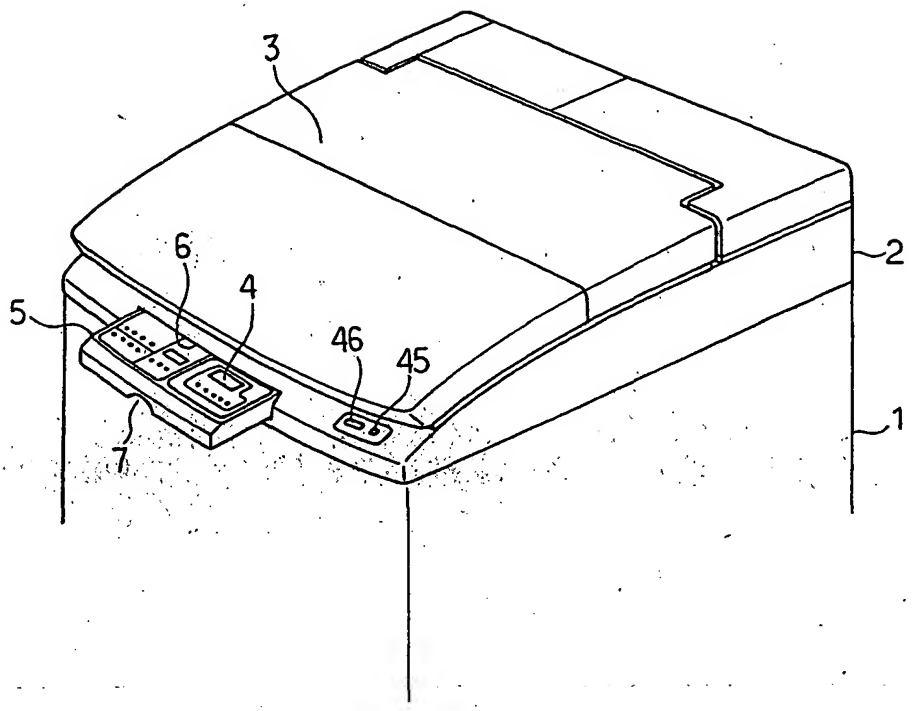

FIG.1

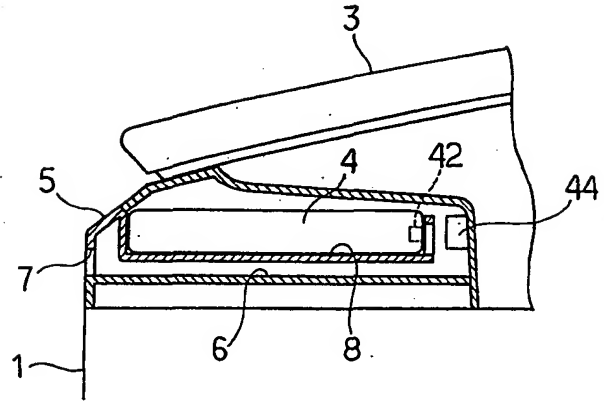

FIG.2

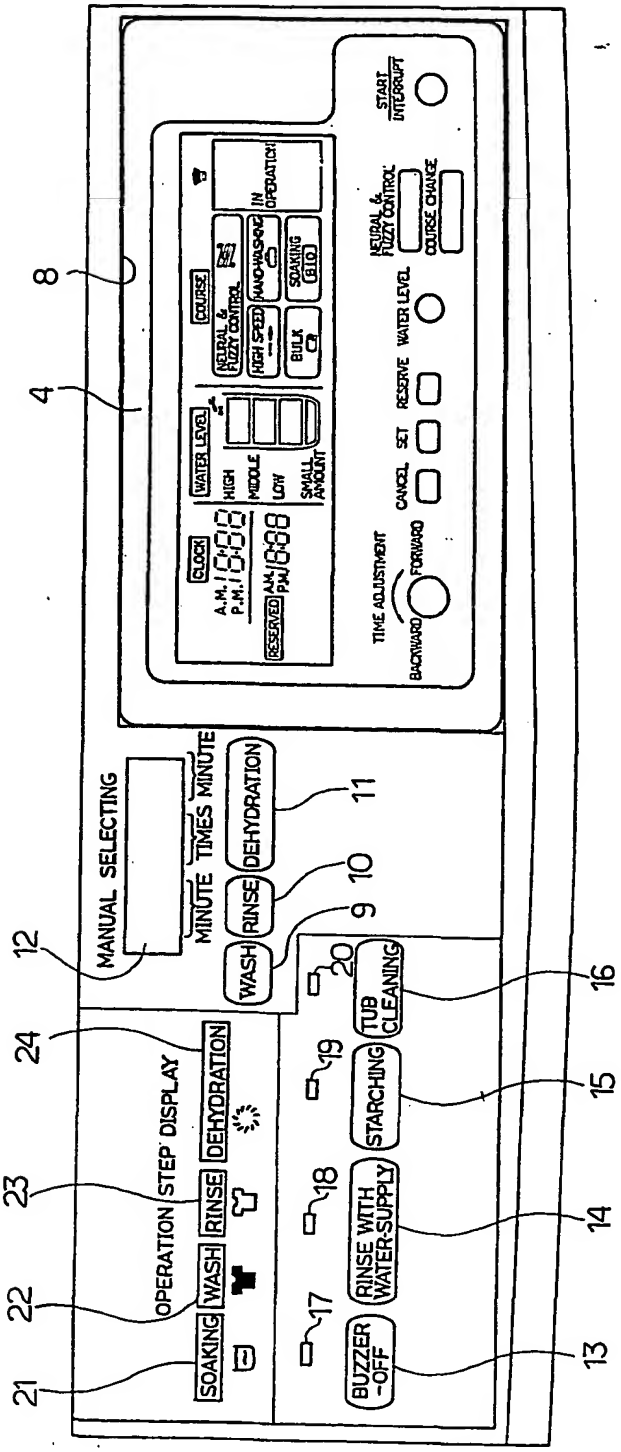
8
4
CLOCK
A.M.
P.M.
RESERVED
AM
PM
WATER LEVEL
HIGH
MIDDLE
LOW
SMALL AMOUNT
COURSE
NEURAL & FUZZY CONTROL
HIGH SPEED
NANO-WASONG
BULK
SOAKING 610
IN OPERATION
START INTERRUPT
NEURAL & FUZZY CONTROL
COURSE CHANGE
TIME ADJUSTMENT
BACKWARD
FORWARD
CANCEL
SET
RESERVE
WATER LEVEL
MANUAL SELECTING
MINUTE
TIMES
MINUTE
WASH
RINSE
DEHYDRATION
11
10
9
12
20
TUB CLEANING
16
19
STARCHING
15
18
RINSE WITH WATER-SUPPLY
14
17
BUZZER -OFF
13
24
DEHYDRATION
23
RINSE
22
WASH
21
SOAKING
OPERATION STEP DISPLAY

FIG.3

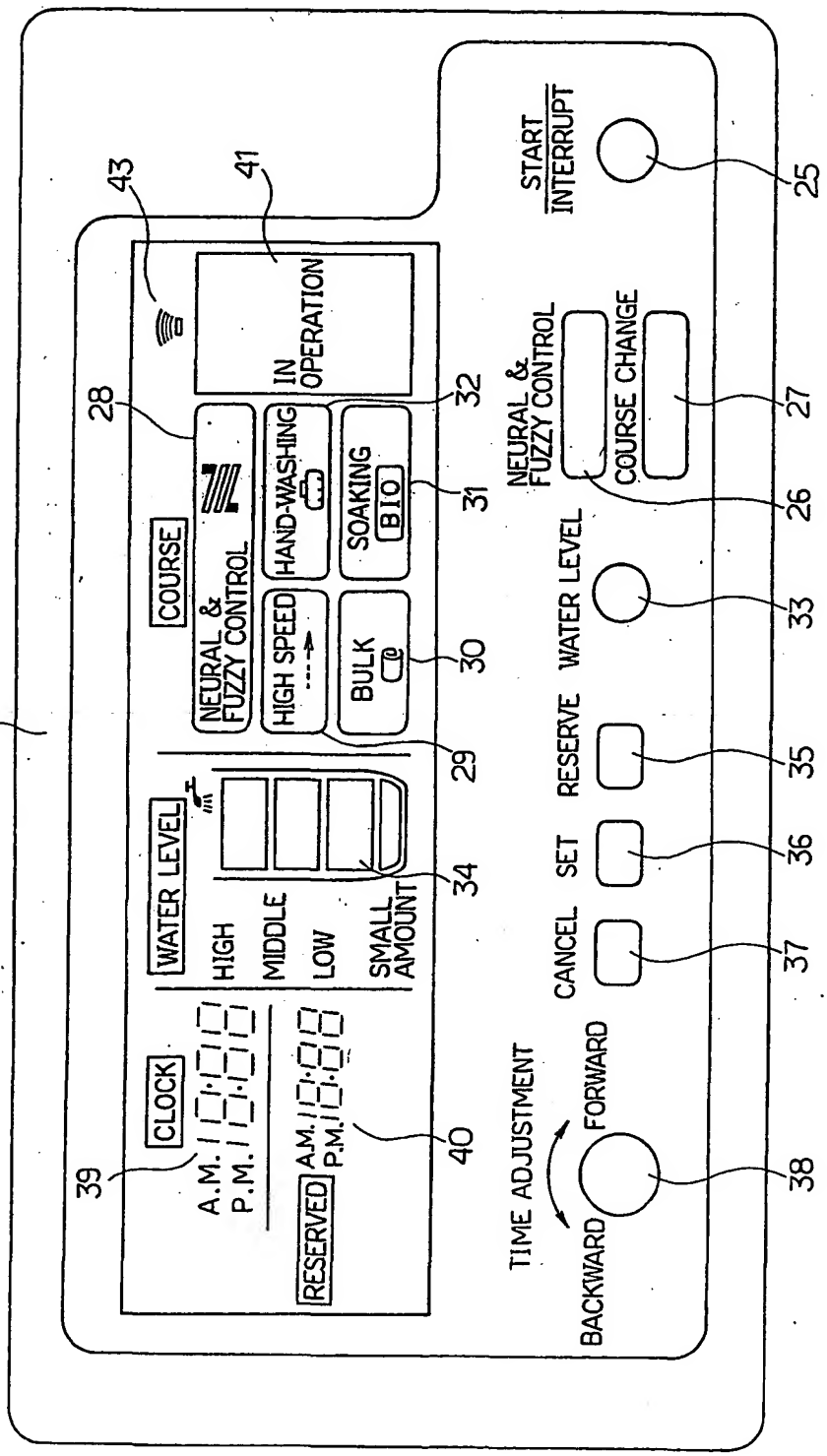
4
43
41
START
INTERRUPT
25
28
IN
OPERATION
32
NEURAL &
FUZZY CONTROL
COURSE CHANGE
27
COURSE
HAND-WASHING
SOAKING
BIO
31
26
NEURAL &
FUZZY CONTROL
WATER LEVEL
HIGH SPEED
BULK
30
33
29
WATER LEVEL
RESERVE
35
HIGH
MIDDLE
LOW
SMALL
AMOUNT
34
SET
36
CANCEL
37
CLOCK
A.M.
P.M.
RESERVED
A.M.
P.M.
39
40
TIME ADJUSTMENT
FORWARD
BACKWARD
38

FIG. 4

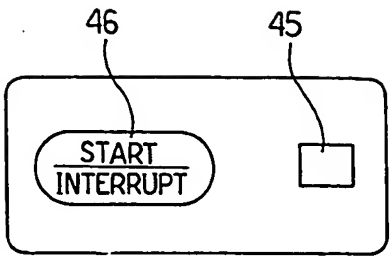

FIG.5

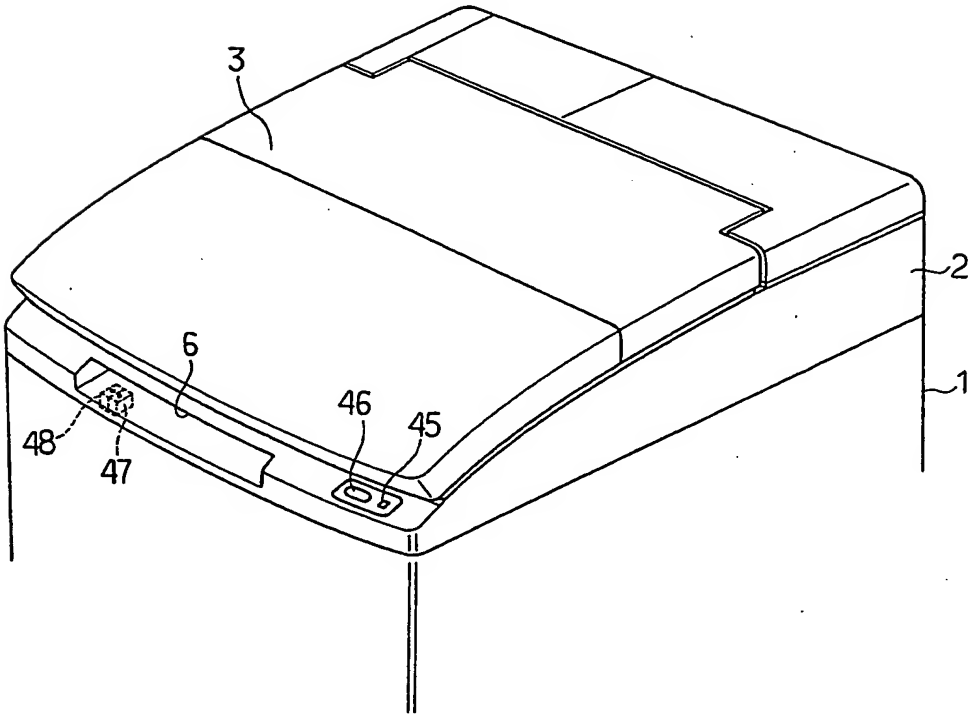

FIG.6

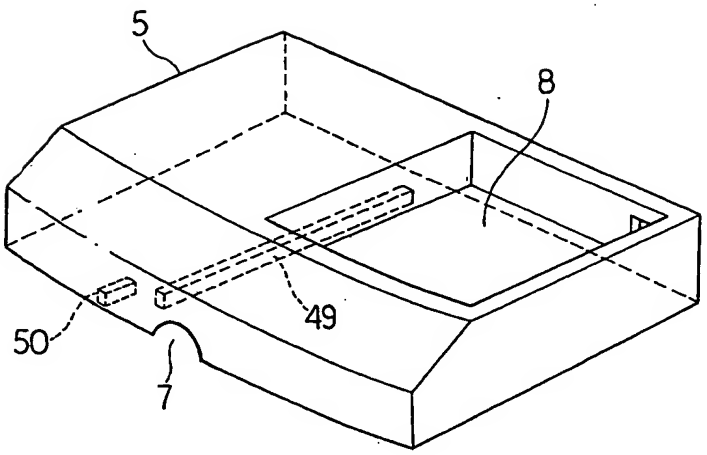

FIG.7

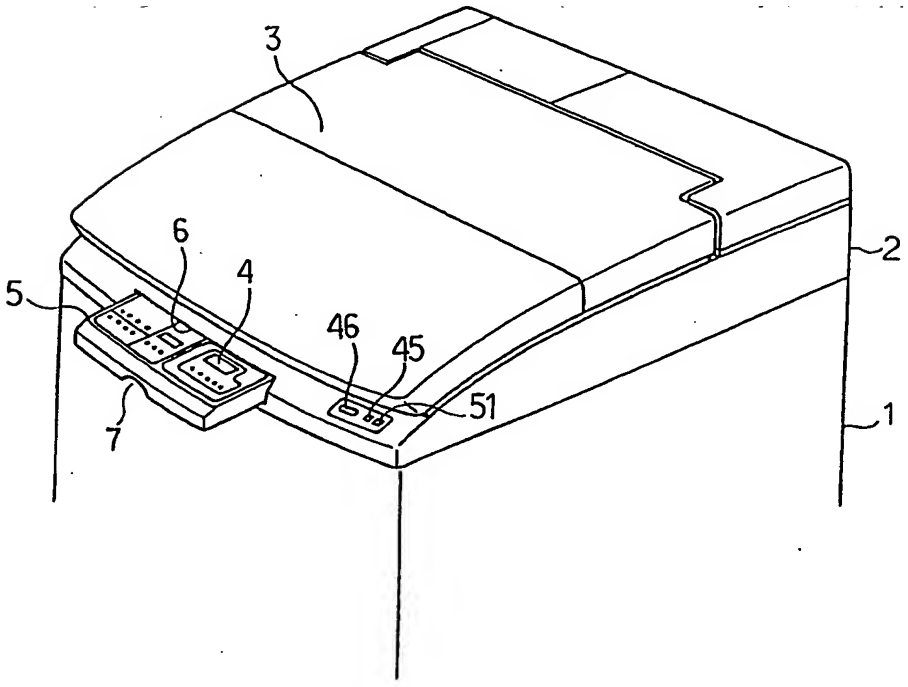

FIG.8

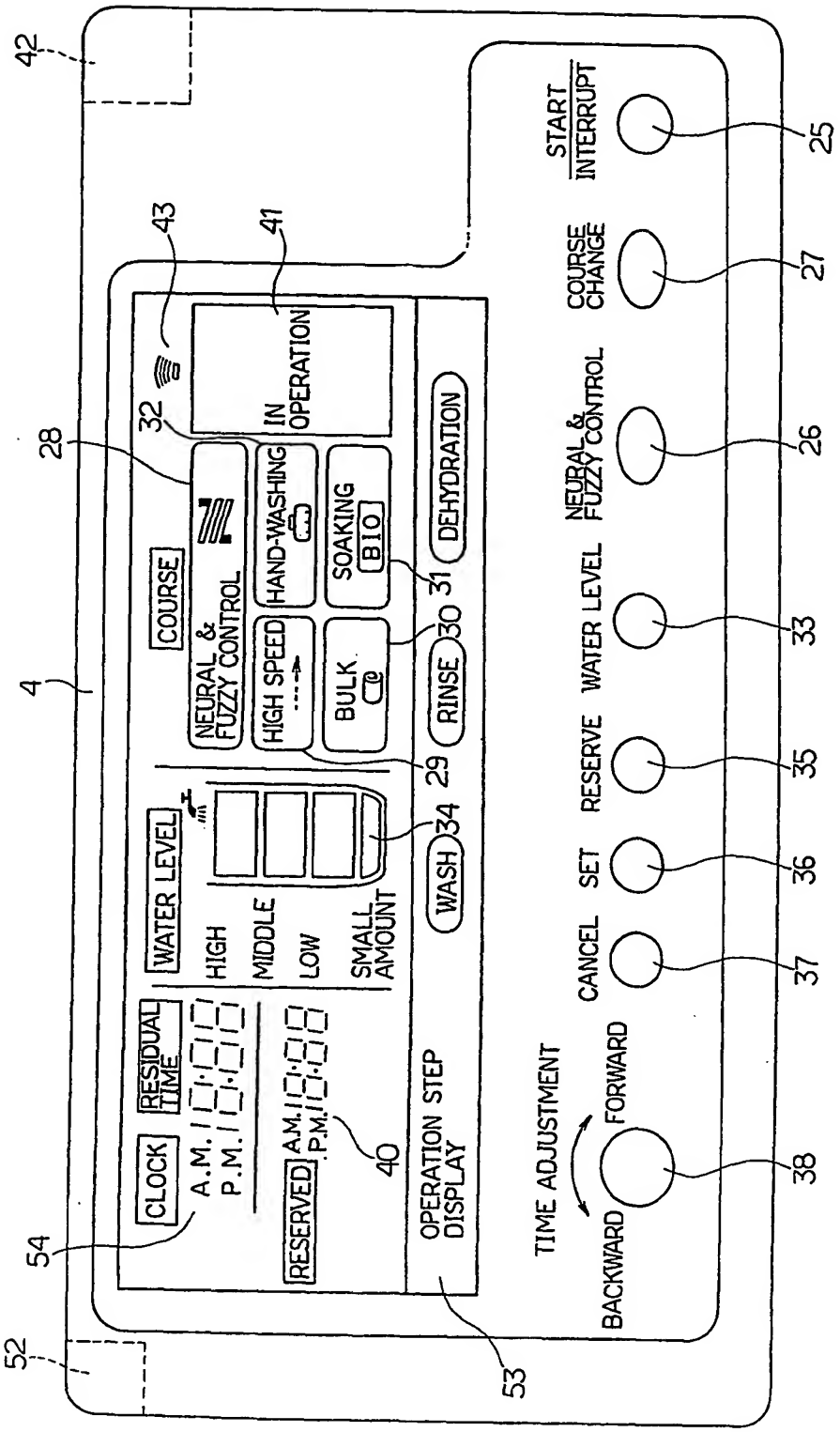
42
4
43
41
28
32
IN OPERATION
COURSE
NEURAL & FUZZY CONTROL
HAND-WASHING
SOAKING
BIO
HIGH SPEED
BULK
DEHYDRATION
RINSE
30
31
29
WATER LEVEL
HIGH
MIDDLE
LOW
SMALL AMOUNT
WASH
34
CLOCK
RESIDUAL TIME
A.M.
P.M.
RESERVED
40
OPERATION STEP DISPLAY
53
54
52
TIME ADJUSTMENT
BACKWARD
FORWARD
CANCEL
SET
RESERVE
WATER LEVEL
NEURAL & FUZZY CONTROL
COURSE CHANGE
START INTERRUPT
25
27
26
33
35
36
37
38

FIG.9

REMOTELY CONTROLLED WASHING MACHINE

This invention relates to a remotely controlled washing machine equipped with a detachable transmitter delivering control command signals so that the washing operation is controlled on the basis of the signals.

Washing machines have conventionally been provided with an operation panel mounted on a top cover. Various switches are mounted in the operation panel and operated so that the washing operation performed by the washing machine is controlled. However, a user need to access the operation panel to operate the switches every time the command to the washing machine is necessary, which is troublesome.

Therefore, an object of the present invention is to provide a remotely controlled washing machine wherein the commands for control of the washing operation can be delivered remotely from the washing machine.

The present invention provides a remotely controlled washing machine comprising a mounting section provided in a suitable portion of the washing machine, a transmitter detachably attached to the mounting section, the transmitter including a plurality of operation members for setting control commands necessary for a washing operation of the washing machine and transmission means for delivering set control command signals into a space, and a remote setting mode receiving section receiving the control command signal delivered by the transmission means of the transmitter into

the space so that the washing operation is controlled on the basis of the received control command signals.

In accordance with the remotely controlled washing machine, the transmitter can be operated remotely from the washing machine so that the control command signals for control of the washing operation are transmitted to the washing machine. Consequently, the setting of the control commands to the washing machine can be performed readily. Furthermore, the transmitter can be prevented from being lost since it is kept in the mounting section when not used.

In a preferred form of the invention, the remotely controlled washing machine further comprises an attachment mode receiving section together with the remote setting mode receiving section, and the mounting section is formed in the operation panel drawably housed in the washing machine and the transmitter is detachably attached to the operation panel. Furthermore, switch means is provided for rendering the attachment mode receiving section operative in response to draw of the operation panel out of the washing machine and for rendering the remote setting mode receiving section operative in response to housing the operation panel into the washing machine.

In accordance with the above-described preferred form, the washing machine can be controlled both in the remote setting mode and in the attachment mode by use of a single transmitter.

In another preferred form, the transmitter comprises

means for receiving, from the washing machine, an indication signal indicative of the progress of the washing operation, display means for displaying the progress of the washing operation on the basis of the received indication signal, and signal delivery display means for performing a displaying operation upon delivery of the control command signal into the space.

In accordance with the above-described preferred form, the operation of the washing machine can be monitored remotely and consequently, an abnormal operation of the washing machine, even if it occurs, can be coped with quickly.

In further another preferred form, the remotely controlled washing machine further comprises first operation members provided both at the washing machine side and at the transmitter side for operating a start switch starting the washing operation of the washing machine and second operation members provided both at the washing machine side and at the transmitter side for operating an interruption switch interrupting the washing operation of the washing machine. Furthermore, for the purpose of achieving further improvement in the operation of the washing machine, the operation members for setting the control commands are divided into at least two groups according to a frequency of operation of each operation member, one group of the operation members being provided at the washing machine side and the other group being provided at the transmitter side.

The invention will be described, merely by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a perspective view of the upper portion of a washing machine of a first embodiment in accordance with the present invention;

FIG. 2 is a longitudinally sectional side view of a mounting section of the washing machine, to which a transmitter is attached;

FIG. 3 is a plan view of an operation panel of the washing machine;

FIG. 4 is an enlarged plan view of the transmitter;

FIG. 5 is an enlarged plan view of a light-receiving portion and a START/INTERRUPT key switch mounted on a top cover of the washing machine;

FIG. 6 is a perspective view of the upper portion of the washing machine with the operation panel removed;

FIG. 7 is a schematic perspective view of the operation panel;

FIG. 8 is a view similar to FIG. 1 showing a second embodiment of the invention; and

FIG. 9 is a view similar to FIG. 4 showing the second embodiment.

A first embodiment of the invention will now be described with reference to FIGS. 1-7. A washing machine 1 comprises a water-receiving tub and a dehydration tub rotatively mounted in the water-receiving tub and is

arranged into a conventional fully automatic washing machine wherein a washing operation from a wash step to a dehydration step is automatically performed. The washing machine 1 includes a top cover 2 mounted on its top. A folded lid 3 is mounted on the top cover 2 for closing and opening an access opening (not shown) through which clothes are put into and taken out of the tub.

A cavity 6 is formed in the front portion of the top cover 2 as shown in FIG. 1 and further in FIG. 2. An operation panel 5 equipped with a transmitter 4 is drawably housed in the cavity 6. The cavity 6 has two guide grooves (not shown) formed in its right-hand and left-hand inner side walls respectively. The operation panel 5 is inserted along the guide grooves to be housed in the cavity 6. In the condition that the operation panel 5 is housed in the cavity 6, a user's hand is applied to a hand-catching portion 7 formed in the lower front of the operation panel 5 to be pulled toward the user's side such that the operation panel 5 is drawn out toward the user's side together with the transmitter 4.

FIG. 3 shows an arrangement of the operation panel 5. The transmitter 4 is drawably put into a right-hand half concave mounting section 8 from above. The operation panel 5 has in the other left-hand half portion key switches 9-11 for manually setting operation steps of WASH, RINSE and DEHYDRATION respectively. The operation panel 5 also includes a digital display 12, key switches 13-16 for

BUZZER-OFF, RINSE WITH WATER-SUPPLY, STARCHING and TUB-CLEANING and corresponding LED's 17-20. The operation panel 5 further includes display sections 21-24 for displaying the steps of SOAKING, WASH, RINSE and DEHYDRATION respectively.

The transmitter 4 includes a START/INTERRUPT key switch 25, a NEURAL & FUZZY CONTROL course setting key switch 26, a COURSE-CHANGING key switch 27, display sections 28-32 displaying the set courses, a WATER-LEVEL setting key switch 33, a display section 34 displaying the set water level, a RESERVE key switch 35, a current time setting key switch 36, a CANCEL key switch 37 for canceling the reserved operation, an operation knob 38 for setting a reserved time for initiation of the washing operation, a display section 39 displaying the current time in the digital mode, and a display section 40 displaying the reserved time in the digital mode. The transmitter 4 is further provided with a display section 41 displaying an indication of "IN OPERATION" and a display section 43 serving as signal delivery display means for flashing several times, for example, when the contents of a washing operation set by the above-described various key switches and the operation knob 38 are transferred to the washing machine 1 by means of infrared rays radiated from a light-emitting section 42 provided in the rear of the washing machine 1. Of the above-described control command setting key switches, those having a lower frequency of operation are mounted in the operation panel of the washing machine 1 and those having a

higher frequency of operation are mounted in the transmitter 4.

A first light-receiving section 44 serving as an attachment mode receiving section is provided in the inner portion of the cavity 6 formed in the top cover 2 so that it corresponds to the light-emitting section 42 of the transmitter 4. A second light-receiving section 45 serving as remote control mode receiving section is provided in the right-hand end of the front of the top cover 2. A START/INTERRUPT key switch 46 is provided in the vicinity of the second light-receiving section 45, as shown in detail in FIG. 5.

First and second detection switches 47 and 48 are provided on the bottom of the cavity 6 of the top cover 2, as shown in FIG. 6. First and second ribs 49 and 50 are provided on the underside of the operation panel 5, as shown in FIG. 7. When the operation panel 5 is drawn out of the cavity 6, the first detection switch 47 is actuated by the first rib 49 so that the first light-receiving section 44 is rendered effective. When the operation panel 5 is retracted into the cavity 6, the second detection switch 48 is actuated by the second rib 50 so that the second light-receiving section 45 is rendered effective.

In operation, the various switches mounted on the operation panel 5 and the various switches and the operation knob 38 on the transmitter 4 are operated in the condition that the operation panel 5 is drawn out of the cavity 6.

Upon operation of these switches, the infrared rays representative of the commands regarding the washing operation are radiated from the light-emitting section 42. The infrared rays are received by the first light-receiving section 44 to be supplied to the washing machine 1.

The transmitter 4 is detached from the operation panel 5 drawn out of the cavity 6, and then, the operation panel 5 is returned into the cavity 6. When the key switches and the operation knob 38 on the transmitter 4 are operated in this condition, the infrared rays representative of the commands regarding the washing operation are radiated from the light-emitting section 42 and received by the second light-receiving section 45 to be supplied to the washing machine 1.

The transmitter 4 is detachable from the washing machine 1. The commands regarding the washing operation can be supplied to the washing machine 1 by the transmitter 4 even when the user is away from the washing machine 1. Accordingly, although the user needs to go to the washing machine to operate the switches in the prior art, he or she is not forced to access the washing machine 1 to operate the various switches every time he or she needs to operate them.

The transmitter 4 is housed in the concave portion 8 formed in the operation panel 5. Accordingly, the place to put the transmitter 4 in is provided and a possibility of loss of the transmitter 4 is reduced.

The control command signals can be transmitted even in

the condition that the transmitter 4 is housed in the concave portion 8. Thus, the signal transmission can be performed without the transmitter 4 being taken out of the concave portion 8, which provides convenience.

Additionally, the transmitter 4 can be easily taken out of the concave portion 8 of the operation panel 5 since the operation panel 5 can be drawn out of the washing machine forwardly.

FIGS. 8 and 9 illustrate another embodiment of the invention. A light-emitting section 51 is provided next to the second light-receiving section 45 in the front of the top cover 2. The infrared rays from the light-emitting section 51 is used to transmit data of progress of the washing operation, for example, data of an operation step in progress, a residual time period of the step and the like. On the other hand, the transmitter 4 is provided with a light-receiving section 52 as well as the light-emitting section 42. Data transmitted from the washing machine 1 is received by the light-receiving section 52. Furthermore, the transmitter 4 includes a display section 53 for displaying the operation step in progress on the basis of the received data. A display section 54 provided instead of the display section 39 displays in the digital mode the residual time period of the operation step in progress as well as the current time.

In the second embodiment, progress of the washing operation and the like can be confirmed even at a place away

from the washing machine 1, which provides further convenience. Furthermore, the dehydration tub sometimes produces abnormal vibration when clothes are unbalanced in the tub. In this case, the dehydration step takes an unusually long time to be completed and consequently, smooth progress of the washing operation is prevented. Even in the occurrence of such an abnormal condition as described above, the user can recognize the abnormal condition by looking at the contents displayed on the transmitter 4. Consequently, the washing machine 1 can be interrupted for the user to balance the clothes in the dehydration tub. Thus, measures can be quickly taken against the abnormal condition of the washing machine 1.

The foregoing disclosure and drawings are merely illustrative of the principles of the present invention and are not to be interpreted in a limiting sense. The only limitation is to be determined from the scope of the appended claims.

CLAIMS

1. A remotely controlled washing machine comprising:

a) a mounting section provided in a suitable portion of the washing machine;

b) a transmitter detachably attached to the mounting section, the transmitter including a plurality of operation members for setting control commands necessary for a washing operation of the washing machine and transmission means for delivering set control command signals into a space; and

c) a remote setting mode receiving section receiving the control command signal delivered by the transmission means of the transmitter into the space so that the washing operation is controlled on the basis of the received control command signals.

2. A remotely controlled washing machine of claim 1, further comprising an attachment mode receiving section receiving the control command signals delivered from the transmitter in the condition that the transmitter is attached to the mounting section.

3. A remotely controlled washing machine of claim 1, further comprising an operation panel drawably housed in the washing machine and wherein the transmitter is detachably attached to the operation panel.

4. A remotely controlled washing machine of claim 1, wherein the transmitter comprises means for receiving, from the washing machine, an indication signal indicative of the progress of the washing operation and display means for displaying the progress of the washing operation on the basis of the received indication signal.

5. A remotely controlled washing machine of claim 1, wherein the transmitter includes signal delivery display means for performing a displaying operation upon delivery of the control command signal into the space.

6. A remotely controlled washing machine of claim 1, further comprising first operation members provided both at the washing machine side and at the transmitter side for operating a start switch starting the washing operation of the washing machine and second operation members provided both at the washing machine side and at the transmitter side for operating an interruption switch interrupting the washing operation of the washing machine.

7. A remotely controlled washing machine of claim 1, wherein the operation members are divided into at least two groups according to a frequency of operation of each operation member, one group of the operation members being provided at the washing machine side and the other group being provided at the transmitter side.

8. A remotely controlled washing machine of claim 1, wherein the transmitter includes a clock display section.

9. A remotely controlled washing machine of claim 3, further comprising switch means for rendering the attachment mode receiving section operative in response to draw of the operation panel and for rendering the remote setting receiving section operative in response to housing the operation panel into the washing machine.

10. A remotely controlled washing machine substantially as herein described with reference to the accompanying drawings.

Pat nts Act 1977 Examiner's report to the Comptroller under Section 17 (The Search Report)	Application number GB 9305125.8

Relevant Technical fields	Search Examiner
(i) UK Cl (Edition L) D1A(AAA,AB,ADJ,ADL,ADX,AFA,AFX ACA,B,C,D);A4F(F29ALA)G3N(NGL) H3Q(QBRS,QBRX)	T M JAMES
(ii) Int Cl (Edition 5) D06F;A47L	
Databases (see over) (i) UK Patent Office	Date of Search
(ii) ONLINE DATABASES: WPI	28 MAY 1993

Documents considered relevant following a search in respect of claims 1 - 10

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
X,Y	GB 2015870 A (BOSCH) see page 1, lines 73-82	X:1,6,8 Y:4,5
X,Y	GB 1536382 (STANDARD ELECTRIC) see page 1 lines 13-15; page 2 lines 91-95; page 3 lines 3-11	X:1,2,6,8 Y:4,5
Y	EP 0513688 A1 (SAMSUNG) see column 5 lines 38-46	4,5
A	EP 0088611 A2 (SHARP) see page 6 line 26 page 7 line 15	

Category	Identity of document and relevant passages	Relevant to claim(s)

DOCKET NO: ZTP01P18001
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Categories of documents

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&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified collections of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 02/00730

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G08C17/02 G06K19/077

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 G08C G06K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 01366 A (SMITH CHARLOTTE K ;HARROP GEORGE H (US); KIGHT EDWARD C (US); SMIT) 4 January 2001 (2001-01-04) page 5, line 4 -page 6, line 25 page 35, line 20 -page 37, line 14	1,10
Y	US 6 112 152 A (TUTTLE JOHN R) 29 August 2000 (2000-08-29) column 2, line 34 -column 4, line 35 column 4, line 55 - line 62 column 5, line 31 -column 6, line 61	1-10
Y	EP 0 827 100 A (PALOMAR TECHN CORP) 4 March 1998 (1998-03-04) column 3, line 39 -column 5, line 6 column 5, line 28 - line 38 column 6, line 48 -column 8, line 57	1-10

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

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Date of the actual completion of the international search	Date of mailing of the international search report
11 June 2002	17/06/2002

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Pham, P

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/EP 02/00730

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		CA 2213619 A1	26-02-1998
		EP 0827100 A2	04-03-1998
		JP 10190519 A	21-07-1998

Docket # ZTP01P18001

Applic. #

Applicant: Wafer Laser

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